

## A SPECIALIZED COCOON OF TELEA POLYPHEMUS.

BY A. RADCLIFFE GROTE.

(Read October 3, 1902.)

The peculiarities of the cocoon of *Telea polyphemus* are well known to lepidopterists. It is of an egg-shape, woven free in the leaf, close and tough in texture, without any false stem or attachment to the tree, deciduous. Among a quantity of Attacid cocoons, received from an old and valued friend of mine in New York, was one which I took at first to belong with the suspensory cocoons of *Philosamia*, among which it came. It was provided with a silken pedicel, 45 mm. in length, which had been spun entirely around the stem of the leaf, not on one side only, and so that the dried stem was enclosed and preserved within. This silken attachment had evidently been shortly fastened above to the branchlet, as is the case with the cocoons of the more specialized Attacid genera, and *Antheræa anylitta*. But the cocoon itself was in this instance far too large and heavy for that of *Philosamia*, and, on examining it closely, it was found to be of a firm, leathery texture, while the chalky-white appearance, which the cocoon of *Telea* presents, could, though with some difficulty, be detected.

All doubts were removed by the appearance, on June 8, of a large female specimen of *Telea polyphemus*, of the ordinary olive-ochre type, a little more intensely colored than usual, but presenting no variation in marking. Now *Telea* does not habitually fasten itself to the leaf and branch in this manner, spinning no false stem or attachment. What circumstances induced this individual to make a singular departure from the habit and custom of the species?

All departures are interesting. This one is particularly so, in view of the ascertained progression in specialization of the Attacid cocoons. Here is an instance of the sudden acquirement of the attachment or pedicel, so that one is led to speculate on the exciting cause. For this purpose a knowledge of the larva, tree, leaf and weather seems necessary, while I have only the moth and the cocoon. But I have elsewhere shown that the specializations of the three states of the Lepidoptera manifest themselves independently. They do not keep exact time in their progression, nor do they move with equal foot, though a general correspondence in direction may be evidenced.

In my work on the Saturnians or Emperor Moths, pp. 15-16, published by the Roemer Museum in June, 1896, I tried to correlate the spinning of an attachment with the increasing breadth of

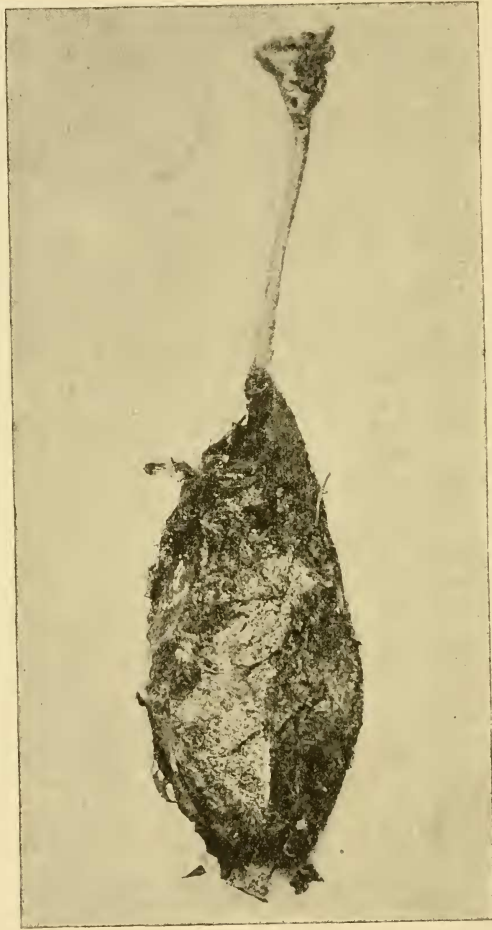


FIG. 1. Cocoon of *Telea polyphemus* with attachment.

wing in the perfect insect. Evidently these large-winged creatures experience the same difficulty in rising from the level ground as do the bats and the swallows. To fly, they must feel the air beneath their wings. It thus became an object, or an advantage,

that the moth should emerge from the cocoon in the high air whence to take its flight. This emergence at an elevation was effected by the spinning of a silken stem, attaching the cradling



FIG. 2. Ordinary cocoon of *Telea polyphemus* without attachment.

leaf permanently to the tree, so that the cocoon could not fall with the dropping of the leaf in the autumn, safely swinging despite the wintry winds. This custom of the larva has become fixed in the arboreal Attacid genera *Philosamia*, *Attacus* and in *Callosamia*

*promethea*. *C. angulifera*, which seems the older form of *Callosamia*, has not acquired the habit. The most generalized group of the ATTACIDES (= *Saturnides* Boisd. 1840, *Saturnina* Dyar, 1894), namely the Aglians or Citheronians, make either a slight cocoon on the surface or none at all, entering the ground to pupate like the Hawk Moths. In the Emperor Moths, specialization of the pupal protection or envelope is evidenced by its growing complexity. *Telea* is one of the genera using a leaf as a wrapper or external support for the cocoon. Neither *Samia* or *Saturnia* have this habit, spinning against stems or branches.

Another advantage arising from the spinning of the cocoon on the tree which served as a food-plant for the larva would be that the perilous descent of the latter down the trunk, to spin in fallen leaves on the ground, is obviated. The habit of descending the tree to pupate appears to be general, and I have observed it with *Actias luna*, which spins a thinner, more papery cocoon than its more specialized ally, *Telea polyphemus*; the cocoon of the latter could probably resist injury to the chrysalis in falling with the leaf.

The specimen of *Telea* here under observation is a remarkably large and heavy one, so that it might be thought possible the larva hesitated to trust to the leaf alone, and hit upon the plan of fastening itself by a silken rope. As against this idea might militate the fact that the forms which habitually attach the cocoon in this manner are relatively light-bodied species, in comparison with their enormous wings. The heavy-bodied species of *Samia* and *Telea* spin no attachment. This latter seems feebly indicated in the cocoon of *Rothschildia iacobææ*. However, the nature of the food-plant may besides hasten or retard the acquirement of the custom, which seems to grow out of the use of a leaf as an outer wrapper, and to correlate with the arboreal habit of the moth.

Whatever opinion we may form regarding the case in point, it is evident that the spinning of the pedicel is not only an advance or a specialization upon an earlier plan of cocoon-making, but that it can be suddenly put forth on occasion by the more generalized or primitive tree-feeding Attacids, as is now demonstrated. And from this instance we may certainly conclude that the habit of spinning a stem to the cocoon has arisen singly, with the leaf-spinning individual, called forth by whatever exciting cause. Out of this individual departure a custom and habit for the species at large has been most probably secondarily developed, since it clearly proved

advantageous to the insect and for the reasons given by me above. So that perhaps in the future both *Telea* and *Actias* may become in this way sessile. And perhaps, when we grasp all the facts which arise in connection with cocoon-making, we may be disposed to recognize in caterpillars, these lowly organisms, an intelligence in so far akin to our own, as it is evidently based upon an identical perception of external conditions. We are here at the simple sources of Mind in Nature.

#### HERMAPHRODITE OF SAMIA CECROPIA.

The occurrence of hermaphroditism or gynandromorphism in the Emperor Moths is sufficiently rare. I may record the fact here that an example of *Samia cecropia* disclosed on June 3, in which the left side, antenna, both wings, and abdomen, so far as can be externally observed, is female, while the right side is as completely male. On the right side the male abdominal clasper can be seen, wanting on the left, so that we have to do with a true hermaphrodite. Incompletely formed eggs were extracted from the left abdominal opening under pressure.

#### LITERATURE ON THE EMPEROR MOTHS.

1874. List of the North American Attaci. *PROC. AM. PHIL. SOC.* (Nov., 1874).  
 1895. Notes upon the North American Saturnina with List of the Species. *Canadian Entomologist*, 263 (September).  
 1895. Supplementary note to the Saturnians, *id.*, 316.  
 1896. Die Saturniiden (Nachtpfauenaugen). *Mittheilungen a. d. Roemer-Museum*, No. 6, June. With three photographic plates and eighteen text illustrations.  
 1896. Die Nachtpfauenaugen mit besonderer Berücksichtigung ihrer Flügelbildung. *Verh. Deutsch., Ges. Nat. u. Aerate*, Frankfurt, p. 197 *et seq.* With eleven text illustrations.  
 1896. Note on *Samia californica*. *Journ. N. Y. Ent. Soc.*, p. 201.  
 1897. Classification of the Saturniides. *Journ. N. Y. Ent. Soc.*, pp. 44 *et seq.* [I would also draw attention here to an interesting paper by W. T. Davis on Intelligence shown by Caterpillars, *id.*, Vol. V.]  
 1898. The wing and larval characters of the Emperor Moths. *Proc. So. London Ent. and Nat. Hist. Soc.* With four figures in text.  
 1902. An aberration of *Actias luna*. *Can. Ent.*, 70, Vol. 34.

ROEMER MUSEUM, June 14, 1902.

*Stated Meeting, October 17, 1902.*

Dr. HAYS in the Chair.

A letter was read from Dr. R. H. Alison, resigning membership.

The donations to the Library were laid upon the table, and thanks were ordered for them.

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*Stated Meeting, November 7, 1902.*

President WISTAR in the Chair.

The donations to the Library were laid upon the table, and thanks were ordered for them.

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*Stated Meeting, November 21, 1902.*

Mr. RICHARD WOOD in the Chair.

The list of donations to the Library was laid on the table, and thanks were ordered for them.

The decease of the following members was announced :

Prof. Ogden N. Rood, at New York, on November 12, 1902, æt. 71.

Mr. George Harding, at New York, on November 17, 1902, æt. 76.

Dr. Julius Platzmann, of Leipzig.

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*Stated Meeting, December 5, 1902.*

President WISTAR in the Chair.

The list of donations to the Library was laid on the table, and thanks were ordered for them.

The decease of the following members was announced :